



MONTHLY NEWSLETTER

THE INSTITUTE OF FUNDAMENTAL STUDIES, SRI LANKA

Director: Professor Cyril Ponnampерума

## ON FURTHER EXPLORATION OF THE MOON

A Lunar-Based Chemical Analysis Laboratory (LBCAL) is the next step in the exploration of the moon. This would support the needs of future astronauts to live on the moon by the year 2001. Professor Cyril Ponnampерума of the Laboratory of the Chemical Evolution, University of Maryland-College Park, USA with Professor Charles W. Gherke of the Cancer Research Centre & University of Missouri-Columbia, USA as Co-Principal Investigators of the National Aeronautics and Space Administration (NASA) have proposed to plan, design and develop a comprehensive lunar-based chemical analysis laboratory that must function in reduced gravity. In order to do so, it is necessary to conduct the research and development required for emergence of this technology based on non-liquid phase methodology, centrifugally-assisted liquid phase separations, capillary techniques, and surface reactions, thus overcoming constraints imposed by the reduced gravity of the lunar base.

This was revealed by Professor Cyril Ponnampерума, Director of the Institute of Fundamental Studies (IFS) and the Science Advisor to the President of Sri Lanka when he delivered a special lecture on "The Study of Moon Rocks" at the IFS Auditorium, Kandy to commemorate the 20th anniversary of the first moon landing.

The LBCAL, he said, will present a unique opportunity for study of five aspects of the future exploration of space: (1) Astronaut Health; (2) Closed Environment Life Support; (3) Lunar Resources; (4) Exobiology; (5) Planetology. "These five aspects are very important as the man on the moon in 2001 will have to live in the lunar base which will be a closed environment in which food will have to be produced. There will be certain amount of chemical analysis going on in the lunar lab. Blood analysis

may have to be performed on the surface of the moon at 1/6 gravity. We have to study the atmosphere he has to breathe and the recycling of waste. There can be very important minerals, because the samples so far analysed on earth were only a few. We may be able to study further on chemical evolution, meteorites and cosmic dust," he said. He also outlined the components, functions, technology, instrumentation, and research and development plan of the LBCAL programme for 2001.

Recalling events leading to the moon landing, reasons for being interested in analysing the moon rocks and moon dust and the results confirmed by the laboratory work, Professor Ponnampерума explained, "...we were interested in finding out how life began. As far back as we can go on the earth upto about 3.5 billion years, life appeared to have been there. When we probed back to beginning of life processes, the oldest rocks on earth were found to be 3.8 billion years old and pointed out to the fact there was already life on earth. We had a wonder-opportunity with the moon rocks which were dated at about 4.5 billion years. That was the reason for our great interest in the organic components of the moon's surface ..."

Reminiscing his experience as a leader of a group in the NASA consortium for lunar analysis - a privilege enjoyed after a rigorous international competition - Professor Ponnampерума explained how the analyses of moon rocks revealed that there was no life on the surface of the moon either in the past or in the present, and how the astronauts were quarantined in fear of possible contamination with microbes of another world, until this protocol was abandoned after the third mission to the moon when it was realized that it was impossible to have anything living there.



## SALT OFFERS A WAY TO SUSTAINABLE FARMING IN THE HUMID TROPICS

The eroded hill slopes and barren landscapes seen all over Sri Lanka's hill country bear eloquent testimony to the failure of many small farmers to successfully farm these lands with subsistence crops like Maize, Kurukkan, Cow Peas and Vegetables. At most, these farmers are able to raise no more than one successful crop on the same land. Rapid loss of soil fertility (resulting from serious soil erosion) and severe weed infestation makes subsequent cropping no longer economically viable.

Now, a new technique developed in the Philippines offers real hope for such farmers. Referred to as 'Sloping Agricultural Land Technology' (SALT), this technique utilizes hedge rows of fast growing leguminous shrubs to control soil erosion and weed growth. The hedge-rows are planted on the contour spaced about 4 meters apart, and the inter row spacing (avenue) is planted with seasonal crops. The shrubs grown in hedge rows are lopped every 6 - 8 weeks and the loppings used to mulch (cover) the soil in the area growing seasonal crops. Covering the soil in this manner suppresses weed growth, conserves soil moisture and also adds essential nutrients (when the leaves decompose).

Mr. Ray Wijewardene who has studied SALT technology in the Philippines has agreed to assist the IFS establish a one hectare demonstration plot. This activity will form part of the IFS Ecology and Conservation program and will be implemented by Mr. Ranjith Mulleriyawa, Visiting Research Associate.

### WORKSHOP ON NEUROSCIENCES

At a recently concluded workshop at the IFS on "Recent Developments in the Neurosciences" the participants agreed to establish a "Society for the Advancement of the Neurosciences in Sri Lanka", to promote a forum for neurologists, neurosurgeons, psychiatrists, psychologists and basic neuro-scientists. This was felt very necessary in view of the fact that while a tremendous progress has taken place throughout the world on basic research on the structure and function of the human brain and ultra modern techniques have been developed to scan the brain, there is no paralld improvement in Sri Lanka. In a country with a population of about 16 million people, there are presently only 3 neurologists, 5 neurosurgeons and only about 20 psychiatrists at consultant level.

## GENETIC ENGINEERING

Recombinant DNA technology is one of the most promising fields in applied molecular biology. There is a general consensus that it will have enormous impact on medicine, agriculture, Pharmacology and on industrial microbiology in the 21st century, said Dr. S.H. Liyanarachchi, Research Associate of the IFS, addressing a Research Meeting recently.

The basic concept of genetic engineering is the manipulation with genes in order to construct novel organisms with desired phenotypes. On the other hand, understanding the precise action of individual genes will facilitate in elucidating the underline biochemical mechanism which is specified by that particular gene. This information is extremely important, particularly in gene therapy used in medicine to alleviate the burden of inherited diseases.

In plant science, genetic engineering can be utilized to carry out highly specific manipulations of genetic material that cannot be done by conventional breeding methods. Besides, it allows the introduction of entirely new genes from unrelated organisms to plants. The main aim of these manipulations is to help the plant breeder, providing new tools to work with, he explained. Increased interest in Recombinant DNA technology in developing countries is caused by its enormous potential that can be used in many economic activities with minimum input, when fully developed, Dr. Liyanarachchi said.

### A TRI-LINGUAL WORD PROCESSOR

An integrated Sinhala/English/Tamil Word Processor has been devised for use on IBM XT/AT computers and compatibles at the IFS Computer Unit by Mr. Anton Rohan Manamudali and Mr. R.W.S.M.S. Godamunne, Visiting Undergraduate Research Associates of the IFS in association with Mr. D.K. Wijeratne and Mr. D.V. Jayampathi.

An important feature in this tri-lingual word processor is that no changes to the basic hardware of the IBM model is necessary to run this program. It uses the 256 ASC77 code addresses available on standard computers with the practical possible economy.

The Board of Governors of the IFS is pleased to see that this information is given to government departments and institutions that can use it.



## BOARD DECISIONS

At the first meeting of the new Board of Governors of the IFS, presided by His Excellency the President (Chairman), the following decisions were made:

EPPAWALA PHOSPHATE: To set up a pilot project with the help of the Ministry of Industries to use the rich deposit for the benefit of Sri Lanka and possibly to develop the export market of super-phosphate.

IFS THINK TANKS: To make available to policy makers in the Ministries, information provided by the IFS Think Tanks on landslides, alternative energy sources and agro-forestry.

INTERNATIONAL CONSORTIUM: To set up a consortium of nations for further support of the IFS.

REGIONAL CENTRE: To make the IFS a network of International Centres and the Regional Centre for the Third World Academy of Sciences (TWAS), International Centre for Theoretical Physics (ICTP) and the World Lab.

PHASE II: To follow up Phase II plan of the IFS a National Centre for Biotechnology so that by 1990 the project should be in place.

FELLOWSHIPS: The Board of Governors unanimously approved the recommendation of the Director to confer the title of 'Fellow' on the following:

Research Fellow : Dr. R. Weerasooriya

Junior Research : Mr. L.P. Perera

Fellow : Mr. L.P.C. Weerackody

Pre-University : Mr. Harsha Gamage

Fellow : Mr. Ashanka Beligaswatte

Mr. Sujeewa Perera

IFS PROFESSOR: The Board also unanimously approved the recommendation of the Director to appoint Prof. Ranjan Ramasamy as Professor of the IFS.

Professor Ramasamy had his education at the University of Cambridge and is internationally recognized for his work on Malaria vaccines. Before joining the IFS he had worked at the Universities of Nairobi, Jaffna, Hokkaido, and the Queensland Institute of Medical Research, Brisbane.

## STAFF NEWS

### ...ATTENDS GEOLOGICAL CONGRESS

Professor Kapila Daharayake, Senior Research Fellow of the IFS, attended the 28th International Geological Congress held at the prestigious Conventions Centre, Washington DC from 9 - 19 July 1989. Hosted by the US Geological Survey and the National Academy of Sciences of the USA this Congress is said to be the biggest event for the geologists. About 7,000 of them from all over the world participated and about 3,000 presented papers. Professor Daharayake's presentation was on Eppawala Phosphates. He also attended the session on Landslides and spoke on Landslides in Sri Lanka. Dr. Weerasooriya's paper on "Water decontamination" was presented at the poster session.

### ...VISITS CANADIAN UNIVERSITIES

Professor S.A. Kulasoorya, Professor of the IFS, visited Universities of Toronto, McGill (Montreal), Manitoba (Winnipeg), Calgary, and British Columbia (Vancouver) during his visit to Canada as a Senior Fellow of the Association of Commonwealth Universities.

### ...NOW IN SINGAPORE

Professor Padmasiri de Silva, Senior Research Associate of the IFS, is now in Singapore on a UNESCO award to write a monograph on "Environmental Ethics". He will also teach Philosophy at the National University of Singapore. He writes that he will continue to maintain links with the IFS.

### ...DONATE BLOOD

In response to an urgent appeal from the Kandy General Hospital during curfew hours 10 members of the IFS staff available at that time donated blood.

## PUBLICATIONS

Weerasooriya S.V.R. and Dissanayake C.B., The Enhanced formation of N-Nitrosamines in Fulvic Acid Mediated Environment, Toxicological and Environmental Chemistry (in press)

Dissanayake M.A.K.L., Tennakone K., Illeperuma O.A. and Samarappuli S.H.S.P., A New Superconducting Material in a U-Ba-Cu-O and Bi-Ca-Sr-Cu-O Mixed System, Modern Physics letters B, Vol 3 No.5 (1989) pp 447



# IFS EVENTS - AUGUST 1989

- 01.08.1989  
Tuesday  
Research Meeting conducted by Mr. Sampath Godamunne, URA/IFS and Mr. Rohan Manamudali, URA/IFS on "Integrated Sinhala/English/Tamil Word Processor" at 3.30 p.m. at the IFS Kandy.
- Research Meeting conducted by Mr. Sujeewa Perera, PRF/IFS on "Nuts & Bolts in Electronic Mail, Chem Word Processor etc. at 4.00 p.m. at the IFS Kandy. (IFS Scientists)
- 02.08.1989  
Wednesday  
Research Colloquium conducted by Mr. G.K. Upawansa, Consultant in Biogas, National Engineering Research and Development Centre, Ekala, Jaala on "State of Biogas Technology in Sri Lanka and it's Benefits" at 3.30 p.m. at the IFS Kandy. (All are welcome)
- 08.08.1989  
Tuesday  
Research Meeting conducted by Mr. A.C. Wimal Lalith de Alwis, Junior Research Associate/IFS on "Can Reflection and Refraction both occur simultaneously through a single photon?" at 3.30 p.m. at the IFS, Kandy. (IFS Scientists)
- 10.08.1989 -  
12.08.1989  
Workshop on Geoscientific Writing and Editing conducted by Prof. P.G. Cooray, Senior Research Associate/IFS at the IFS Kandy. (By invitation)
- 15.08.1989  
Tuesday  
Research Meeting conducted by Mr. R.K.U. Silva, Junior Research Associate/IFS on "Preparation of Acetylene terminated Polymers" at 3.30 p.m. at the IFS, Kandy. (IFS Scientists)
- 17.08.1989  
Thursday  
Special Public Lecture conducted by Dr. M.R. Chandratillake, Lecturer in Chemistry, Manchester University, U.K. on "Talking Rubbish: An approach to radioactive waste disposal" at 3.30 p.m. at the IFS, Kandy. (All are welcome)
- 21.08.1989 -  
02.09.1989  
Internal workshop on HPLC, A.A., G.C. conducted by Dr. G. Honda, University of Maryland at the IFS Kandy. (IFS Scientists)
- 23.08.1989  
Wednesday  
Bicentennial of the French Revolution. Special Lecture Series. "The French Revolution and the Rights of Man" conducted by Mr. Bernard Plagnet, Professor, University of Social Sciences of Toulouse, France at 5.00 p.m. at the Sawsiripaya Auditorium, Colombo 7. (All are welcome)
- 29.08.1989  
Tuesday  
Journal Club  
Discussants: Ms. C. Rambukwella and Ms. S. Ramanayake
- 30.08.1989  
Wednesday  
Research Colloquium on "Biological Control of Salvinia" conducted by Dr. I.V.S. Fernando, Senior Lecturer, Department of Zoology, University of Kelaniya at 3.30 p.m. at the IFS Kandy. (All are welcome)